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EDITORIAL NOTES

FUEL—THE WIDER ASPECT

AT the beginning of 1942, after over two years of war, the Gas Industry stands firm and united to meet any eventuality. The past two years have served to strengthen its wartime service capabilities. Its organization is more closely knit and more clearly defined and understood to co-operate effectively with the Government in furthering and broadening the war effort. We have the Directorate of Gas Supply, with Dr. E. W. Smith at its head, to give drive and direction where and when needed; we have had experience of aerial attack and have gained in our knowledge of how to deal speedily with its effects; with necessarily depleted staffs research is being continued; workable committees have been set up to consider several current problems and to make recommendations; questions of wartime service are being well tackled from a new angle; and sight has not been lost of the future—the Post-War Planning Committee is at work. The New Year finds the Industry more consolidated and full of purpose and resolve, better prepared to interpret new thought and fit in with new plans. We hope that the coming twelve months will bring about a clearer conception of its proper functions in any general fuel plan or policy.

We think that recent contributions, communications, and even bare announcements we have published in our pages are indicative of the broader outlook the Industry is developing; this applies to the spheres of activity and usefulness of gas, coke, and chemical products, though we are not yet thinking "big enough" as an Industry and many prejudices remain to be rolled flat. We have long held the view that the Gas Industry should regard itself as a combined fuel and chemical industry, and we cannot think that conditions have so altered as to justify a change in this opinion. That such a view is immediate and fact-facing does not blur vision concerning the possibilities of complete gasification making feasible in the future a gas and liquid products industry. Though the time for giving practical effect to these fascinating possibilities is not yet with us, the Industry is wisely continuing its research work in this field of high pressure gasification and catalytic synthesis. In the meantime we must press on with developments of economically proved processes and methods, and with extension of proved and defined markets for gas, coke, and liquid products.

This development, too, must be in concert with other fuel and power interests. This is the urgent and fundamental question with which we shall have to cope and to which a solution will have to be found. The aim must be a comprehensive fuel scheme, each fuel being used in the sphere best fitted for it, with the interests of the public as the basic consideration. When we think of the number of thoughtful and forceful suggestions and recommendations on the matter which have been put forward during the past twenty years it is dismaying that so far little has actually been done about it. However, 1942 may witness action as distinct from mere digestion of words. We should not be at all surprised if it sees the setting-up of a Ministry of Fuel.

The situation was admirably reviewed in its wide aspect by Dr. C. H. Lander, formerly Director of Fuel Research, in an Address last month to the Fuel Luncheon Club—which Club, by the way, has already provided a platform for many important addresses by authorities on the production and utilization of the various fuels. The problem of the utilization of coal is to find how the energy stored in the seams can best be transferred to the spot where it is needed—a problem easy of statement, but more obscure in fulfilment. Regarding the nature and the potentialities of the various coalfields throughout the country we have a mine of valuable information, thanks to the work of the Coal Survey. What steps should be taken to ensure that this information—a starting point in a chain of processes—will be used to the best advantage? How best can we utilize the potential heat of a coal seam? Dr. Lander suggested that, in view of the advice offered during the past twenty years, lack of attention to the matter was neither more nor less than a scandal. He referred to the fact that as long ago as 1925 the Samuel Commission, dealing with the utilization of coal, pointed out that the question was not one of a simple choice between one or two alternative methods, but of the balancing of a variety of factors, that it involved the co-ordination, not, as was often supposed, of two industries, but of several—coal, gas, electricity, oil, chemical products, coke, and so on.

We have our Coal Survey; no organization has yet dealt comprehensively with a utilization survey. Commenting on this question of utilization the Samuel Commission in 1925 stated: "We consider that such a survey is imperatively required in the national interest. But we hold the view that it is not a matter on which a single investigation, undertaken at a particular time, would be likely to yield the most fruitful results. The problems to be dealt with are so diverse and the sciences and practices that are concerned are in a state of such active development, that the survey which is needed should rather be a continuous process undertaken by a body of a permanent character." Since 1925 there has been a great increase in technical knowledge of the utilization of coal. Efficiencies in the gas and electrical industries have been raised; we are thinking of both the production and the utilization of these sources of energy. But development has been unco-ordinated, and reckless competition resulted in expensive overlapping of the two services prior to the war. Only the fringe of the substitution of raw coal has yet been touched, in spite of these developments. The desirability of regarding the coal utilization problem as a whole was clearly recognized by the few in 1925, but recommendations and suggestions made then and repeatedly since resulted not in more collaboration but in more and fiercer competition at the expense of the consumer in many instances—that is, prior to the war. If a utilization survey on a broad basis was needed in 1925—and we think it was needed—surely the necessity of such a survey is more apparent in 1942, as a basis for organizing the production and utilization of fuel on a national scale in a manner which would ensure economical use being made of the wasting assets of our coal reserves and at the same time ensure amenities which should be accessible at the lowest possible cost to every member of the community.

SOLID FUEL RESEARCH

TURNING for a moment to research on solid fuel, we were interested in the Presidential Address of Sir Evan Williams to members of the British Coal Utilization Research Association. It was given at the fourth annual meeting held at the Association's Experimental Station at West Brompton last month, when those present had the opportunity of seeing work in progress and the results of research. The success of this Research Association has, we think, been striking, though not surprising, and doubtless the Gas Industry will have taken note of the progress made and the consolidation effected. There has been expansion both of revenue and

expenditure,—a reflection of the increasing demands from industry for the services of the Association. Capital expenditure on the Experimental Station was completed in 1940, the cost being within £20,000. Of this, three-fifths had been written off at the end of that year. Special grants from Industrial Groups for the acceleration of programmes have been more than quadrupled —surely a test of the confidence which a research organization on these lines enjoys. This growth in strength, it must be borne in mind, has been effected in a period of war difficulties.

Among the main lines of investigation in 1940 were, first, the development of a portable gas producer to replace petrol on the road, and, secondly, the finding of a suitable producer fuel which could be manufactured in large quantities from coals available throughout the country. We were specially interested in the remarks of Sir Evan Williams in this regard. Though he could not disclose details, his observations, we think, give no cause for pessimism; quite the reverse, in fact. He said that the importance of producer gas as an alternative to petrol was overshadowed by disappointments during the period of enthusiastic development which followed the outbreak of war, and he pointed to the difference between employing charcoal and solid fuels derived from coal. The task was the use of the latter fuels, not of charcoal, to replace petrol; and, he remarked, "only those who have been directly engaged on this problem can appreciate its great technical difficulty." Yet, in a comparatively short time a number of vehicles operating on producer gas were placed on the road which "have been giving service which does not compare unfavourably with petrol." As to the second part of the problem, "it is now possible to produce in large quantities fuels suitable for gas producers making use of coals available in three-quarters of the coal-producing districts of England, Scotland, and Wales." The problem in its widest aspect is under consideration by a Committee set up by the Secretary for Mines, the constitution of which Committee we gave in the "JOURNAL" of Nov. 19 last, and to the work of which we referred in an editorial comment on Nov. 26. It satisfies us that the Gas Industry could provide the requisite fuel in quantity should it be considered expedient to produce it; this, of course, implies that some guarantee of adequate coal supplies for the purpose would be forthcoming, and that supplies of raw material and labour for the making of the producer plant would also be assured.

PRODUCTION FLEXIBILITY

WE call attention at the start of the year to the extremely useful wartime Paper given recently by Mr. T. C. Finlayson to the Eastern Counties Gas Managers' Association. We published the Paper in the "JOURNAL" of Dec. 24. It was concerned with the flexibility of carbonizing plant—continuous vertical retorts and intermittent vertical chambers—under present conditions and contained in small compass (just over a page of the "JOURNAL") many practical hints and suggestions. In war circumstances it is natural that very great interest should be focused on the flexibility of carbonizing plant, and this flexibility, when economic considerations take second place to the maintenance of an adequate supply of gas, is quite remarkable and its range perhaps insufficiently appreciated. Of course, constant conditions of operation of a modern high temperature carbonizing plant lead to the highest efficiency and the lowest maintenance cost; but it must not be thought that substantial and rapid changes in output need be accompanied by serious difficulties or damage to the plant.

We think it would be useful if we underlined a few of the points made by the Author, who is a recognized authority on the subject. With continuous vertical retorts output can be altered by variation in coal throughput, modification in scurfing procedure, "standing" retorts, and using coals of different quality; and resort can also be had to partial coal-gas firing. Coal throughput (variation in which, to maintain constant calorific value, calls for alteration in retort steam and combustion chamber temperatures) can be reduced 25–30% within 12 hours while maintaining satisfactory retorting conditions, and full throughput can be resumed in 24 hours. Again, at a sacrifice in yield of gas per ton of coal, retorts may be worked at an overload of 5–10% above rated gas output. By varying the scurfing programme to suit output requirements a substantial degree of flexibility can be attained. By adopting the method of "standing" retorts the production of a continuous vertical retort installation can be reduced by 50% in five hours or so and can be brought back to full output in a comparatively few hours with little trouble or labour costs. In regard to coal quality, output of gas varies considerably according to the nature and the grading of the coal carbonized. For instance, the output of therms from a given retort is reduced by 20% by changing over from Yorkshire nuts to Durham run-of-mine coal. In certain circumstances it may pay undertakings to carbonize the coals which give lower output per retort during periods when the demand is lower. Then, in practice up to 50% of the heating value of the fuel gas required for any setting can be supplied in the form of coal gas—a procedure which, by the way, introduces no operating difficulties. If it is decided to turn over to partial coal-gas firing, a reduction in output of about 22% can be immediately effected. Alternatively, if it is decided to stop partial coal-gas firing the increase in output is immediately about 28%.

There is, then, no difficulty with a modern continuous vertical retort plant in meeting sudden changes in gas demand provided suitable steps are taken; and the same flexibility is shown by intermittent vertical chambers. In view of possible happenings it is helpful to bear in mind that if there is a sudden need to reduce gas make, then in one hour the output from a given plant can be reduced by 22% by adopting partial coal-gas firing; that in six hours the output can be reduced by a total of 72% by "standing" 50% of the retorts and by partial coal-gas firing; and that within six hours the output can be brought back to normal. It would take a great many "extremely beautiful" enemy bombs to cause cessation of gas production and supply.

Precautions Against Frost

Under wartime conditions more than ever is it necessary to take every precaution to prevent breakages and stoppages of plant, large and small alike, which could be avoided. For this reason we were glad to publish in our issue of Dec. 24 last what we consider to be a most useful set of precautions against damage by frost in gas-works. We were able to do this through the courtesy of Mr. G. M. Gill, who sent us a memorandum issued to the constituent undertakings of the Severn Valley Gas Corporation, Ltd., and the advice covered all types of gas-works plant—condensers and washers and scrubbers ; meters, gasholders, and purifiers; governors, boilers, compressors, and gas engines. There is not the slightest doubt that the little extra trouble taken at these times will be amply repaid by freedom from accidents and stoppages, when replacement and repair are difficult and labour is attenuated. Gas-works maintenance staff should be fully acquainted with the details and recommendations put forward, and steps should be taken to ensure that the suggestions are carried into practical effect as part of regular routine. In this way smooth working can be achieved and much money and inconvenience can be saved. The gasholder is, of course, of first concern in frosty weather. If neglected, the supply to the town is endangered and great structural damage can ensue. Different types of holder require different treatment, and the memorandum dealt with each type separately. It was stated that the temperature of the water in the tank must be prevented from falling below 32°F. Comment regarding this is made by Mr. H. J. Toogood in a letter we publish to-day, and we think his suggestion is a good one that a safe margin should be maintained above the critical temperature of 32°F. He suggests a margin of 5°F.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Personal

At an Informal Luncheon held recently in the North British Station Hotel, Edinburgh, a company of Border Gas Managers gathered to take leave of Mr. ROBERT J. GAVIN of the Melrose Gas Company, who was recently appointed Manager of the Royston Gas Company. Mr. Gavin was presented with a suitably inscribed gold wristlet watch in token of esteem and he also accepted a leather handbag on behalf of his wife. Mr. Robert Cowie, sen., of Hawick, presided over the gathering, which was attended by the Gas Managers from Galashiels, Selkirk, Kelso, Peebles, Innerleithen, Jedburgh, Duns, Berwick, and North Berwick.

Obituary

J. A. Morris

By the death of JOSEPH ALBERT MORRIS, in an Oxford nursing home on Dec. 29, we have lost a very dear friend. Before he retired from the "JOURNAL" Staff on March 31, 1937, he completed 50 years' active service with the firm, and since then, up to the onset of his last illness, he attended most assiduously to his duties as a Director, having been elected to the Board in 1934.

When J. A. Morris joined the "JOURNAL" in 1886, the whole small staff of those days had to be able to take a hand at most things, and, growing up with the business, he acquired a knowledge of the working of all its branches. The writer well remembers, on arriving at 11, Bolt Court as a raw recruit in 1912, being handed over by his father to J.A.M. to be taught the weekly round of a newspaper office. Since then, those of us who have succeeded Walter King have learned something of the character for which he valued J.A.M. so highly; no family could have had a more loyal friend in good times and in bad, no family business more devoted service so ungrudgingly rendered. For both he had a very real affection and, up to an advanced stage of his illness, not only was the arrival of the "JOURNAL" the outstanding event of the week, but much of it was read aloud to him twice and even three times, especially the advertisement pages, which had been his special care since his appointment as Advertisement Manager in 1909.

Almost to the end it was astonishing to those who did not know to learn that he had passed the seventy mark. First in to the office, and generally last away, was his habit for many years up to the day of his retirement, and few can remember his having a day's absence for illness. And into retirement he carried an upright bearing and an alert step which had long been famous in Bolt Court and which seemed to promise many years of activity. With the threat of war he took a leading part in organizing A.R.P. in his native Wandsworth; on its outbreak he put his training to practical use, and, in addition, gave those of us who remained with the "JOURNAL" the benefit of his experience with one of our worst problems—paper. It was a great shock to us to learn in the early spring of last year that his health had broken down, and, when the end came last week, we had to content ourselves with being thankful that he had been released from suffering bravely borne.

All in the Gas Industry who came into contact with J. A. Morris in the course of business, all, of whatever generation or rank, who have had the happiness to work with him as colleague, must feel better for having known him. We have never heard him spoken of except as a most lovable man; it is inconceivable that we ever should. All—and especially those of us who had knowledge of a wonderful domestic partnership—offer our deepest sympathy to his widow. W. R. K.

Letters to the Editor

Domestic Water Heating

SIR,—The interesting review contained in your recent Leaders arising from Dr. Leopold Friedman's and Mr. F. Brooks' articles upon this all-important subject so recalls to mind those early days nearly 40 years ago, when much interest was evinced in the development of the "circulator" and the various styles or forms of the storage and piping systems to which they were applied, that I am prompted to write a comment upon some of the features which have an important bearing upon the successful use of gas in producing hot water for domestic purposes.

Originally the gas boiler (often so termed) was more often than not fitted to assist the kitchen range in supplying hot water for early morning baths, and as such was frequently worked intermittently, but with the disappearance of the coal range and the more extensive use of a gas cooker as the sole means of preparing meals, the gas water heater, whether of the storage or "geyser" type, had to fulfil the full duty, and in more recent years the multipoint has been added, thus covering the whole field of requirements in "all-gas" houses.

In the earlier years circulators were often coupled to ill-designed "tank" systems then found in many houses, and low efficiencies resulted by joint flow and return pipes and the impossibility of maintaining stratification. This weakness was demonstrated by tests of this, and the cylinder principles, under otherwise equal conditions; and while it is recognized that even a properly designed thermal storage set cannot deliver water at the tap without some temperature drop at the point of discharge, it is possible to envisage similar loss of heat whether the delivery is taken from a storage vessel or a multipoint, varying, of course, with the rate of discharge and the consequent time in obtaining the desired quantity for the purpose in view.

Turning at random to one of various records of tests contained in a Paper read to the Staff of the Brentford Gas Company in November, 1911, it is shown that with a boiler flow temperature of 158°F. the water delivered suffered a drop of only 4°F., while the stratification of hot and cold water within any properly designed storage should maintain a temperature difference of 80°F. within one and a half inches both in circulation and drawing of water. This, I think, may be taken as a guide to the point mentioned in your issue of Dec. 24.

The drop in temperature is influenced in various ways, including length of delivery branch and rate of discharge, the latter being of considerable importance, and in this respect the storage principle has an advantage in comparison with the slower delivery rate of instantaneous heaters.

There is another salient feature in storage apparatus inasmuch as with those appliances which perform the process of heating in one circulation yielding a temperature rise in the region of 80°F., the water thus circulated to the top of the cylinder is available for immediate use without heating the whole contents of the vessel, a principle that was embodied in the original design of our series of heaters from the outset; and although several of the gas companies' officials in the London area who attended the many experiments and tests of the years 1904 to 1910 have now passed on, others of the older generation will remember the origin of this principle, which we have always maintained.

One could write at length upon other aspects of the case put forward by my colleague Mr. F. Brooks, but doubtless your invitation to correspondents will receive many replies from other sources.

Yours faithfully,

20–30, Buckhold Road,
Wandsworth,
London, S.W. 18.
Jan. 1, 1942.

THOMAS POTTERTON (HEATING ENGINEERS) LTD.,
T. F. C. POTTERTON,
Joint Managing Director.

Ice Prevention in Gasholder Tanks

DEAR SIR,—The universal importance of this problem prompts me to enquire whether the statement on page 469 of the "JOURNAL" of Dec. 24, "In frosty weather the obvious thing is to prevent the temperature of the water in the tank being reduced below 32°F.," is based on a wrong premise, or is but an unfortunate slip of the pen.

If it is true that water at 32°F. becomes ice at 32°F., then the water in a gasholder tank cannot fall below 32°F., and thermometers would continue to register 32°F. throughout the phenomenon of the extraction of the latent heat of ice-formation and consequently could give no guidance.

Therefore 32°F. is the *dangerous temperature of water*. If this be so, then I suggest the following as better representing the context of the Author's Memorandum: "In frosty weather the obvious thing is to maintain the water in the tank at a safe margin of temperature above the critical and dangerous freezing point, 32°F.—say at 37°F., at which margin of 5°F. temperature the thermometers will continue to register and function as safe and reliable guides.

Stoke Pero,
43, Uxbridge Road, Hampton.
Dec. 27, 1941.

Yours faithfully,
H. J. TOOGOOD.

LETTERS TO THE EDITOR—continued.

Peat for H_2S Removal

DEAR SIR,—In expressing appreciation of your remarks in the leading article in your issue of Dec. 10 on the work carried out at Billingham on the use of peat for gas purification, may I point out that it is by no means certain that the lower the proportion of peat the smaller the concentration of ammonia required to maintain the bacterial activity. If the function of the ammonia is to maintain a suitable degree of alkalinity, the ammonia requirements may well be independent of the proportion of peat. There will, of course, be a preliminary stage after a freshly-charged box is put on line in which the ammonia is all consumed in neutralizing the peat. During this stage a larger proportion of peat will demand more ammonia, but after the neutralization is finished, it is possible that the minimum ammonia concentration may be more or less independent of the amount of peat.

In my Paper it was suggested that should there be a fall in the activity of the experimental peat-oxide mixture purifying coal gas, it might be improved by increasing the ammonia concentration above the present 25 grains per 100 cu.ft. The mixture in question is giving a sufficiently good performance to justify the hope that such an increase may not be necessary. Recent small-scale experimental work at Billingham suggests that after the preliminary period when the mass is actively absorbing ammonia the concentration can be reduced a good deal without adverse effect.

It is by no means easy to obtain under laboratory conditions reliable evidence of the minimum ammonia requirements for satisfactory purification. The obvious place to obtain this evidence is at the gas-works oxide boxes themselves. Any managers who give peat-oxide mixtures a trial will be doing a big service to the Industry by providing data which cannot easily be obtained in another way. It would be unfortunate if the views you express in your letter deter gas managers from making tests in their boxes.

Yours faithfully,

"Willowmere,"
Hartburn,
Stockton-on-Tees.
Dec. 31, 1941.

For I.C.I. (Fertilizer & Synthetic Products) Ltd.,
R. QUARENDON,
Gas & Power Research Section.

The Institution of Gas Engineers

The attention of the members of The Institution of Gas Engineers is drawn to the following extracts from the Explanatory Memorandum to the December, 1941, Revision of the Schedule of Reserved Occupations, since in many cases the members of the Institution will become dereserved in accordance with the provisions of the National Service (No. 2) Act, 1941.

"10. *Progressive Raising of Ages of Reservation.*

"Commencing on Jan. 1, 1942, ages of reservation for all occupations in the Schedule, except those specified in Appendix III, will be raised by one year on the first day of each month. Thus, if the age of reservation for an occupation shown in the Schedule is 25, it will become 26 on Jan. 1, 1942, 27 on Feb. 1, and so on. Alternative ages of reservation—*e.g.*, 25/35, will become 26/36 on Jan. 1, 27/37 on Feb. 1, and so on. A notification will be sent to each man affected by this arrangement stating the date on which he will cease to be reserved and requesting him to inform his employer. Men below the ages of reservation for their occupations, including men who cease to be reserved as a result of the raising of ages of reservation each month, will, where necessary, be retained in industry by means of individual deferment of calling up. Individual deferment will thus gradually replace reservation under the Schedule. The method by which employers should make application for the deferment of the calling up of men who are not reserved is set out in Paragraph 11.

"11. *Deferment of Calling up of Men not Reserved.*

"Subject to paragraph 13, application may be made for the deferment of the calling up of men, whether engaged on protected or unprotected work, who are not reserved; such applications will be admitted only where the Minister of Labour and National Service is satisfied that the man for whom deferment is sought is engaged on work of national importance, that the work must continue in order to maintain necessary production or services essential for the community, and that the man cannot be replaced by an older or unfit man, or by a woman. Deferment cannot be granted after an enlistment notice has been issued. Forms of application for deferment (Forms N.S. 300) and a leaflet (N.L. 8) explaining the method of making application may be obtained at any local office of the Ministry of Labour and National Service. Application forms, after completion, should be forwarded to the office of the Ministry of Labour and National Service shown on the man's certificate of registration (N.S. 2). Where a man ceases to be reserved under the arrangement for the progressive raising of ages of reservation (paragraph 10) any application by his employer for the deferment of his calling up must be made at least 15 days before the date on which he ceases to be reserved. If the employer does not make such an application, an opportunity will be given to the man to make an application for deferment when he is called for medical examination.

"12. *Apprentices.*

"The calling up of apprentices in occupations for which the age of reservation is 25 or under at Dec. 1, 1941, will upon application be deferred until the completion of their apprenticeship or until they attain the age of 20, whichever is the earlier. Applications should be made to the local office of the Ministry of Labour and National Service."

A Message to the American Gas Association

The following is the text of a letter dated Dec. 22, 1941, addressed by Sir Francis Joseph, President of the Society of British Gas Industries, to the President of the American Gas Association:

"A year ago your President, Mr. Beckjord, expressing the good wishes of the American Gas Association to Britain, wrote: 'It looks as though we are getting closer to the struggle.' That was indeed prophetic, as the dramatic events of the past month have proved.

"As President of the Society of British Gas Industries, allow me to express through you to your members our sympathy with the sufferings and sacrifices which have been inflicted by an enemy whose lust for power has challenged your great nation. You are just putting on your armour, and I am confident that under the leadership of President Roosevelt you will not lay aside the shield nor return the sword to its scabbard until you have conquered.

"Democratic nations have many virtues but they have a cardinal fault. They believe that those who differ from them in political aims or in outlook are honourable and animated by decent human instincts. We know and you now know (unfortunately) how misplaced has been this faith.

"As regards the duration of the war, we on our part are under no delusions. It is true we under-rated the reserves and strength of our enemies. It is equally true that we underestimated how widespread and efficient was their poisonous propaganda, but those delusions have been swept away. What we never doubted is our ability to win. What we never questioned is our determination to face the sacrifices and to be endowed with strength to maintain the struggle until we have won through. We must and will dictate the peace; until we are able to do so this struggle must go on. We may lose our material wealth in prosecuting this war to a finish, but we know that this is as dust in the balances compared with the preservation of liberty and freedom. We also know that there can be no peace or compromise with evil and injustice. We share with you the priceless heritage of being born free, and under God we will live free—or die.

"These are not the vapourings of a man who is outside the fighting age limit, but express the conviction of every section of the British people. Nations, like individuals, grow their wisdom teeth by biting on the hard granite facts of life and experience. The unity of the great American nation was laid by the sacrifices of war. You, like us, will lay broad and sure the foundations of world peace and justice by the sacrifices of this war. It is a time when every man must do his duty with cheerfulness and with supreme confidence in his leaders and the cause. It is a time when we must shoulder the burden and tread the mountain path of duty. It will be a long road, but the vision at the end of that long trail will give to us the supreme satisfaction of knowing that we have done our duty in such a way that those who follow after will say, 'They did not fail us!'

"So, Mr. President, I take my leave of you as a colleague in an Industry which is making a great contribution towards the equipment of our forces and the maintenance of the morale and contentment of our peoples. May God prosper your country and ours in this, our common cause."

A Meeting of the B.C.G.A. Executive Committee will be held on Jan. 14 at 11 a.m. at Gas Industry House.

A Meeting of the Central Executive Board of the National Gas Council will be held in Committee Room No. 1, Gas Industry House, 1, Grosvenor Place, S.W. 1, on Tuesday, Jan. 13, at 1.30 p.m.

Meetings of the Finance Committee (11 a.m.), Executive Committee (11.30 a.m.), and Central Committee (1.30 p.m.) of the London and Counties Coke Association will be held at Gas Industry House, London, S.W. 1, on Monday, Jan. 19.

The Second Annual Christmas Party and Dance of the Mid-Kent Utilities Social and Athletic Club took place at the Devonshire Rooms, Snodland, on Monday, Dec. 22. A large gathering of the employees of the Gas and Water Companies with their wives and children were present and a very entertaining and pleasant evening was spent. Prizes given for various competitions and dances were presented by Mrs. W. Stotesbury, wife of the General Manager of the Mid-Kent Water Company, while the children of the employees were presented with a War Savings Xmas Card and stamps in lieu of presents from the usual Xmas tree by Mr. W. A. Barnett, M.B.E., on behalf of the Social Club.

CALORIFIC VALUE OF GAS

YESTERDAY, TO-DAY, AND TO-MORROW

Discussion on the Address by Mr. James Jamieson, Junior Vice-President of The Institution of Gas Engineers.—See "JOURNAL" of Dec. 17, 1941, p. 426.

Joint Meeting of the Scottish Junior Gas Association—Eastern and Western Districts—held at Edinburgh on Saturday, Dec. 6, 1941.

Mr. **J. J. Scott** (Cowdenbeath): There has been much loose talk about low grade gas, its composition and other observations, but the increasing development of 400 gas for public supply by large and small undertakings is surely the answer to such observations. The choice of plants which facilitate the production of this quality on an economic basis, with low inert content, is available to almost any size of works. From my own experience of producing 400 gas with inerts not exceeding 12% with suitable plant combination the cost per therm into holder compares favourably with any other production methods for similar size of works.

Regarding the effect upon the distribution system, I endorse the views of Mr. Jamieson. If the capacity of mains and services is so near the limit that a moderate reduction in quality cannot be effected, this is surely a pointer to the fact that the system requires attention. The peak load of the present day has focused attention to this matter irrespective of quality, and it would be sound practice to face both factors in any development scheme.

Since experience has demonstrated that the production, distribution, and utilization of low grade gas is beyond the experimental stage, the principal factors with which the Industry has still to deal lie mainly in the post-war national policy in regard to coal conservation and by-products. This aspect is rather clouded because of the demands made upon the Industry by war conditions.

We must not overlook the peacetime problems surrounding the Industry in the disposal of its coke, tar, and liquor, which necessitated the introduction of coke grading, sales development associations, tar dehydration plants, and competition requiring gas engineers to become road making specialists to enable them to find a market for tar. My view is that low grade gas can help to a considerable degree in reducing these problems. I consider that the smaller works should be relieved of all these ancillary plants and concentrate upon the maximum gas yield from coal as the one objective. Standardization of quality, in the interests of appliances, bulk supply, and the regulation of residual products will be part of the national policy; and in my view low grade gas will greatly help towards that end.

Mr. **W. N. Baird** (Perth): My impression is that Mr. Jamieson has not entirely convinced himself that a low gas quality is the ultimate solution for the Gas Industry in Scotland.

We are invited to answer three simple questions:

(1) Does the Gas Industry *need* a universal standard C.V. of gas? My impression is that the answer is Yes! The advantages of standardization are so obvious that I cannot imagine even a half-alive person disputing that point.

(2) Does the Gas Industry *want* a universal standard C.V. of gas? My impression is that the answer is again simply Yes! The general consensus of dead and living opinion on that point would, I am sure, be in concord, *but how that state is to be achieved is quite another problem.*

(3) Will 400 B.Th.U. gas be the ultimate standard for Scotland? With the present state of the coal industry it will be safer to quote Bernard Shaw and say "You never can tell," but I accept Mr. Jamieson's challenge and range myself in opposition to many of his arguments.

In one form or another, the question of the relative usefulness of gases of different heating values has been debated since 1894, when Sainte Claire Deville pioneered investigations on the subject. From that date till now there have been innumerable contributions to, and controversies upon, this question, both in this country and abroad.

The most generally accepted investigations were carried out by the Bureau of Standards in U.S.A. (1913–17) and by the Joint Gas Research Committee in this country. The bulk of the American work was carried out with gases of 500–700 B.Th.U./cu.ft., whereas the British calorific values ranged from 240–550 B.Th.U./cu.ft.

The conclusions of both these bodies was identical in that the value of gases was proportionate to their heat content. Opinions at variance were expressed by individuals, including G. Helps and G. Keillor, but the difficulty in evaluating their researches turns upon the time element involved in the tests, since an increased efficiency can undoubtedly be obtained when a longer period is taken. This I would imagine is because radiation losses are relatively small compared with the gain in heat extraction when the products of combustion are reduced in temperature.

The behaviour of low C.V. gases also depends upon the inerts and the composition of these inerts. For example, it was found by the Research Committee that gases of low C.V. and high inerts were distinctly inferior on all grounds to similar low C.V. gases low in inerts.

Again, a gas in which the inerts are largely in the form of air does not behave as a poor gas, but as an equivalent volume of the original air-free gas.

Sir Dugald Clerk in 1918 said, "We do not mind inerts so long as we do not pay for them, but we do not want to pay for heat units when we are getting nitrogen and oxygen, which we can obtain from the atmosphere without paying for them."

My submission is that with a low C.V. gas consumers will ultimately by paying for the unavoidable inerts. I feel sure, too, that there will be a Plimsoll line for gas quality, below which it would be dangerous to go. To date, there is no evidence to show whether 400 B.Th.U./cu.ft. gas is the penultimate limit to which we may safely degenerate, but it is in my mind that the low C.V. gas now supplied by G. Helps is certainly considerably above the normal price of that commodity elsewhere, but even there it would not be safe to particularize without a full knowledge of the facts.

Mr. Jamieson says that the differences in declared calorific values cannot be accounted for by differences in carbonizing plant, and this is probably quite true. The reason why there are so many small discrepancies can, I believe, be quite simply explained. The 1916 Act which first placed the supply of gas on a voluntary thermal basis also allowed complete latitude in the choice of declared value. At that time, however, many works had little or no knowledge of the C.V. of their gas, and hence, after the introduction of a calorimeter, when the gas was found to be of a certain average quality varying very little from day to day, it was natural that the engineers at that time chose the particular quality which did not interfere with their ordinary routine work and the manner in which their plant ordinarily operated. In this way a very large variety of gas qualities came into being. When verticals replace horizontals it would be reasonable to expect that the original declared value would then be reduced by a redeclaration, or maintained by an increased use of carburetting oil.

Having once found a quality that did not interfere with the general running of the works, it is extremely unlikely that any engineer would purposely create for himself undue trouble by declaring either a higher or a lower C.V. There is bound to be a general reluctance to make any such alteration, without obvious justification, and that justification has only recently appeared with the extension of benzole extraction and the direction of bunker-like coal for gas-making purposes.

The main factor influencing the normal quality of gas produced is the normal quality of coal received. Neighbouring undertakings will undoubtedly have differences in quality if they do not use the same coals, and the choice of coals has been influenced by economic factors as well as by the idiosyncrasies of individual engineers.

On the face of it, it does seem absurd that a few undertakings situated in the near neighbourhood of certain coalfields obtain coal from far and wide. The economic factor is, however, still there. If a coal contains over 20% inerts (moisture and ash) and gives a residual coke of about 20% ash, it certainly does not pay to transport that coal long distances, and it can even be a far better proposition to pay a higher transport charge on coal with only 5% inerts, yielding a coke of, say, 8% or less of ash.

Apart from these considerations, there is always the fact that holidays in one area differ entirely from holidays in another, and to avoid a disturbance in supplies it is advantageous to buy coals from widely separated sources. Again, if the total supplies are limited to one, two, or three collieries, and there is a breakdown at one of these pits, then 100, 50, or 30% of the coal supply suddenly ceases, so that it is again a better proposition to spread supplies over a fairly large number of individual pits. Another point, of course, is that the coking quality of the coal varies considerably from area to area, and a better average mixture for blending is obtainable when a large number of sources of supply are available.

It seems to me that the main reason why declared C.Vs. are coming down is due first to the tremendous drop in the quality of coal now supplied, secondly the re-directing of certain low volatile coals in place of original contracts, and thirdly, of course, the introduction of benzole extraction. I do not think that it is because there is any inherent desire to obtain a uniform quality in any district, far less region, but simply that these causes are having a preponderating effect on the gas quality produced under normal working conditions.

The deciding factor in gas quality is whether the prime cost and upkeep of the larger carbonizing plants and larger distributing mains and services are fully offset by the saving in manufacturing costs

resulting upon the production of a lower C.V. This has not yet been proved definitely one way or the other.

It is all very interesting to discuss intermediate smaller factors, but the ultimate convenience and cost per therm to the consumers is the only criterion upon which to base any argument. Undertakings which have reduced their gas quality should therefore be, in due time, capable of making an honest comparison, but at present with high wages and even higher cost of materials it would be impossible to work out this argument to finality, especially when present capital costs bear no relation to those incurred some years ago.

Mr. Jamieson feels that a benzole plant and a C.W.G. plant are essential in order to "ring the changes," and so take full advantage of the residual product market. There is much to be said for that. In wartime, the value of benzole extraction is immense, and I would be prepared to go so far as to say that there should be stringent penalties to anyone who is frustrating the national effort by not extracting the maximum amount of that valuable substance, unless, of course, there is a very good reason for not doing so. In peacetime I am still fully convinced that, in Scotland at least, a benzole plant is only profitable in circumstances outside the normal routine of carbonization practice with vertical retorts, and that certainly from a national point of view, when coal is this country's *one and only great asset*, it is sad to think of its being frittered away because of the peculiar antiknock properties associated with the spirit extracted from coal gas. I will go even further and suggest that instead of taking higher grade spirit out of our gas we should be putting lower grade oils into that gas. In other words, let us carbonize coal to the economic limit of gas quality, and replace loss of quality by carburetted oil. The world has comparatively unlimited resources of oil, while we in this country have strictly limited coal resources. The latter must be preserved, because upon that preservation depends our industrial supremacy as a nation.

To my mind a great deal of nonsense is talked about coke, for although it is a smokeless fuel it certainly is not a fumeless product, and the sulphur products of its combustion are just as deleterious as those of coal. Because the colour has been taken out of the smoke it does not follow that the products remaining are harmless.

The solution of dividing carbonization between coal and oil would reduce the Gas Industry's dependence upon one fuel source, and thereby produce a valuable economic lever. It would, moreover, to all intents and purposes deliver us from the solid fuel market altogether, and it would finally assist us to dissolve a great amount of the sulphur trouble, or at least allow us to concentrate upon that problem, because there are other solutions besides benzole extraction—*e.g.*, Thylox process and the Fischer and Brandt process.

In another part of his personal symposium Mr. Jamieson says that the gas for industrial purposes will only be universally adopted when we can deliver that gas at a low uniform price to undercut all other fuels. How can we ever hope to reach that figure while we are dependent upon the whims of two monopolistic groups—collieries and railways—especially when the production of high quality gas-making coals is on a rapid descent?

Some of the disadvantages of lower C.V. gas are:

(1) Longer time to do the same work, or—

(2) Necessity for higher gas pressures, and—

(3) Consequent increase in unaccounted for gas due to meters registering gas at slightly higher pressure.

(4) Larger sizes of mains, greater capital and revenue costs.

(5) Larger meters.

(6) Larger carbonizing plants, larger boiler plants, greater ground area. In some instances, increased man power.

(7) Greater proportion of uneconomic breeze produced.

(8) Increased cost of condensation and wet and dry purification processes.

(9) Increased sulphur content of gas manufactured.

(10) Greater cost for equal storage capacity.

There are others, too—corrosion, for example. I have made no attempt to work out a complete balance sheet, but these factors to my mind are sufficient to nullify the benefits derived from the cheaper production of gaseous therms at a lower gas quality.

The present day trend of declaring lower C.V. gas is merely an expedient either to offset some of the financial losses and/or results incurred by benzole extraction, or to cope with the poor quality of coal now obtainable, or perhaps merely because of the non-availability of oil for C.W.G. plant.

Mr. D. N. Garrie (Tayport): As a matter of high policy, and a real step towards unification of the Gas Industry, a national standard of gas quality is a worthy ideal; but past discussion has revealed a wide diversity of view regarding the correct quality to be distributed. Such degree of uniformity as does exist appears to be the result of a policy of general expedience in manufacture rather than of precise knowledge of optimum quality for efficient utilization.

In considering which quality is best, it must be remembered that the term "quality" embraces the characteristics of specific gravity and combustibility as well as calorific value. Quality may vary from time to time through adventitious admixture of inerts, even though C.V. be held constant, and conditions would be more acute on a district obtaining supplies from several works using different diluents. I submit that a simple declaration of calorific value is not sufficiently comprehensive to ensure national uniformity of gas quality.

Nowadays the bulk of town gas is essentially a mixture of coal gas and blue water gas, each of reasonably constant composition, whether made by the one-stage or two-stage process, and present-day appliances have a surprisingly wide tolerance to variation of C.V. with this mixture. If the two primary characteristics were controlled, a variation of some 50 B.Th.U. might be permissible, providing a band of C.Vs. within which appliances would operate satisfactorily; and individual undertakings would select a value to suit their local conditions.

The optimum quality for efficient utilization is by no means a critical value, but my opinion is that 450 B.Th.U. is the lowest which completely fulfils all domestic requirements. In any case, the quality produced must always be related to lowest cost per therm, and in 1932 Mr. Jamieson published the result of a classical investigation of this question. There are many points in connexion with the results at the lower C.Vs. which I should like to discuss but will restrict myself to the one aspect of coke production.

When steaming down to 425 B.Th.U. and below, there is not only a substantial decrease in coke available for sale, but also a marked deterioration in ignitability and free-burning qualities which will still be detected on test, I imagine, with coke from 450 quality. Since coke marketing affects cost of gas production so profoundly, some attempt to assess the depreciated value of the coke should be made and the lower figure used in the production balance-sheet. Incidentally, it may be noted that the two-stage process is not subject to this disability or to other factors which operate to the detriment of production of low-quality gas by steaming the charge.

It seems to me that the disparity between the higher grade gas most suitable for distribution and that most economical of production might prove to be less than generally recognized, and with market research the disparity might ultimately vanish and the two qualities coincide.

I consider national uniformity of quality to be a desirable objective capable of practical attainment, and 450 B.Th.U. the best all-round quality for Scotland.

Mr. Aitken (Leven): Statement No. 1 and the comments of the Author thereto would appear to indicate an amazing lack of unanimity of view, yet closer perusal reveals a considerable measure of agreement. Mention of non-statutory undertakings prompts the thought of what the position of such undertakings is likely to be in the probable trend of development and if they have not outlived their day. I fail to appreciate the necessity for small differences in calorific value, particularly in small undertakings. Mr. Jamieson's view that no gas-works is properly equipped unless it has a benzole recovery plant and a carburetted water gas plant, the former if complete sulphur removal is to become a practical reality and the latter to take advantage of changes in the residual markets, would seem to indicate belief in the elimination altogether of the small gas undertaking. Together with the elimination of small calorific value differences, this would considerably curtail the number of C.Vs. declared. To limit the number of C.Vs. declared say in multiples of 25's would appear to me as far as present-day circumstances and conditions justify without appreciable disadvantage to any undertaking, whether from geographical or other circumstances. Indeed, the number of changes of recent date evidences a desire for freedom of choice. Type of plant and geographical conditions necessitate a reasonable measure of latitude. Possible future developments should cause one to hesitate in regard to fixing a standard calorific value. Yet a greater degree of uniformity would have many advantages and is much to be desired.

Mr. D. D. Melvin (Edinburgh): We should not be concerned so much at this stage with what particular calorific value is best for Galashiels or Greenock or Edinburgh. First we require to know more of the ancillary effects over the whole of Scotland. What quantity of coal can be spared; how much coke should be produced; what quantity of tar is required to satisfy the market and what its quality should be in the crude state—these are typical of the questions which will require to be considered for the area as a whole before coming down to a particular undertaking.

Last month the calorific value in Edinburgh was reduced from 475 to 450. Consideration was given to the steps which might be taken in the way of pressure adjustment in order to lessen the number of complaints which it was anticipated were bound to arise. It was finally decided that any alteration in pressure upwards or downwards might lead to additional complications, and so plans were made to cope with adjustments as they were reported. The result was surprising. No increase in the normal work of the maintenance section has been observed and only one complaint has been received from a large consumer. I believe a similar result was experienced when the change from 500 to 475 took place eight years ago. A large number of fixed orifice appliances have been fitted on the district, but their design and adjustment have apparently incorporated sufficient latitude to accommodate the change.

There seems to be a lesson to be learned from this experience. It would appear that one absolute standard calorific value is not essential for the standardization of appliances, and a calorific value might be adopted within 25 B.Th.U. above or below the standard value to suit local conditions. Such a difference could in my opinion only be approved if the distribution system and manufacturing plant were capable of supplying every consumer at constant pressure and constant quality. Distribution systems which require boosting up to

8 in. to accommodate peak loads and fall at the extreme points to 2-3 in. during the load are not good enough. If such systems cannot be altered by increase of capacity they would be better converted to medium pressure systems with individual consumer governors.

I am unable to disabuse my mind of the bogy in distributing lower grade gas in place of high grade. A drop of 100 B.Th.U. from 500 to 400 means an increase in volume of 25% and an increase in pressure drop of 90% to deliver the equivalent amount of heat. Where a distribution system is operating with a drop of a few tenths the effect may not be apparent, but where the pressure drop is measured in inches a serious position would develop.

(To be continued)

Oriental Gas Company Ltd.

The Annual General Meeting of the Company was held at the London Office, Finsbury House, Blomfield Street, E.C. 2, on Wednesday, Dec. 31, 1941, Mr. B. W. ELLIS, A.M.Inst.C.E. (the Chairman), presiding.

The SECRETARY (Mr. A. W. Hentsch) read the notice convening the meeting and the report of the Auditors.

Mr. Bertram Ellis's Address

The CHAIRMAN, on rising to address the shareholders, and to move the adoption of the Directors' Report and the Statement of Accounts for the twelve months ended June 30, 1941, said: Before commencing the business of the meeting I have formally to announce to you the death of our colleague, Mr. William Graham Bradshaw, which befell in March last. He had been a Director for fifteen years, and from first to last was devoted to the Company's interests. His high position in Banking and Legal circles gave authority and weight to his advice, and this, coupled with the warm regard his personality inspired, makes the loss a sorrowful one. I will ask you to stand for a space in respect to his memory.

You will, I assume, take the Accounts as read. This is our third General Meeting since the outbreak of the present war, and the actual field of hostilities has moved nearer to India both from East and West. This being so, it is fitting that I should say less than usual of our activities and resources.

Reviewing the Accounts for the past year: Capital Account is the same, expenditure having been as usual charged to Revenue. Coals are £5,880 higher; we have carbonized 5,770 tons more, and freight has been higher. Salaries and Carbonizing Wages are slightly higher. Purification reappears as a debit, as we sold no spent oxide as in the previous year. Repairs and Maintenance are lower by £5,900, retor, renewal being less. The total is £776 higher. As regards Distributiont Salaries are up by £185, which is normal. Repairs are £7,132 lower, less mainlaying being carried out. Meters are £1,525 lower, and Fittings £1,900 up. Public Lamp Maintenance is slightly higher. Rents, Rates, and Taxes show an increase of £27,180, mainly represented by our assessment for tax in England and India for the current year, and is therefore a reserve against taxation. Directors' Fees are rather more by reason of higher taxation. They would have been higher still but for the Board having drawn smaller fees during the year. Stationery and Printing and General Charges are normal. Total Management costs are £753 higher.

Bad debts are lower, Law Charges the same, and Superannuations down. Provident Fund is the same. Gratuities to Workmen are £400 higher, more men having left during the year. Passages are still lower, no leave to Europe being possible. Insurance is £60 up. Total Revenue Expenditure is higher by £22,100, which is more than accounted for by increase in taxation.

Nearly 10 per cent. More Gas Sold

On the Revenue side, Sale of Gas has increased by £14,038, 69 million more having been sold, an increase of 9.86%. Meter and Cooker Rentals are £120 up. Residuals show an increase of £3,370. Of this Coke and Breeze account for £900, and Tar for £2,430. Of both we have sold less, but at higher prices. Total receipts are higher by £17,156, and the trading profit is £4,944 less. The heavy stocks of residuals have been reduced substantially during the current year.

Now as to the Net Revenue Account. Interest is lower by £70. That on Investments is £36 more, we having invested a further £3,000 during the year. The small loss on exchange of £130 is due to the remittance rate at a fraction under 1s. 6d., and the carry forward will be £1,300 higher after payment of the dividend. The Reserve Accounts are unchanged.

In the Balance Sheet the only item on the Debit side which calls for remark is the last—viz., amounts due by the Company—and this, as I have explained, is accounted for by the provision for taxation in the current year. On the other side, Assets are higher by £25,807. Of this, £12,621 is in cash, £3,000 Investments, £7,452 value of Stocks, and £2,734 amounts due to the Company. The Stock Exchange value of the Investments on June 30 was substantially higher than the Balance-Sheet figure.

During the year the buildings and plant have been maintained thoroughly, and the increase of 9.8% in the sales of gas is a testimony to the ability and energy of our staff and workmen. We are making provision for further increase in our output in the future. Our relations with the Authorities and the other Public Utility Companies are excellent. We have renewed our Lighting contract with the Government Public Works Department for ten years, and this without asking for increase in rates from them. Our workmen continue to give loyal service to the Company. We have made fitting allowances to meet living conditions to their satisfaction. There has been little sickness among them, and no serious disturbances in the City compared with other localities.

And now, before moving the adoption of the Report and Accounts, I shall be glad to reply to any question arising from them.

Mr. STANLEY H. JONES, M.Inst.C.E., formally seconded the motion for the adoption of the Report and Accounts, and it was carried unanimously without discussion.

The Dividend

Proposed by the CHAIRMAN and seconded by Mr. HUGH H. MACLEOD, it was resolved:

> "That a final dividend of 4½%, less income-tax, be declared, making 8%, less income-tax, for the year ended June 30, 1941, and that the warrants for the same be sent by post to the proprietors on January 13, 1942."

Re-elections and Votes of Thanks

Mr. BASIL M. GILL, A.C.A., proposing the re-election of the retiring Directors—Messrs. Stanley H. Jones, Hugh H. Macleod and Arthur M. Paddon—said: Of the three Directors retiring and offering themselves for re-election, Mr. Jones and Mr. Macleod are so well known to you over a long period of years that it is quite unnecessary for me to say anything about them. After our loss by the death of Mr. Bradshaw, we invited Mr. Arthur Matthews Paddon to fill the vacancy, and congratulate you and ourselves on his having accepted office. Mr. Paddon has had a long practice as a Barrister in the Courts and Committee Rooms, and he is experienced in Gas Company management, being on the Board of various Companies. Two of these, like ourselves, are operating abroad in British Dependencies, one being the Bombay Company with which we are in close association. Lastly, he worked for some years in India, acquiring a knowledge of Indian habits and character. From this you will see what a welcome addition he is to the Directorate.

Mr. GEORGE EVETTS, M.Inst.C.E., seconded this, and it was agreed to.

The Directors' Report announced with regret the retirement of Mr. S. W. Savage, who had been an Auditor of the Company for nearly fifty years. Mr. E. J. Carter, C.A., was a candidate for the vacant position, and the Directors recommended his election. This was agreed to, and Mr. F. J. Bradfield, F.C.I.S., was at the same time re-appointed an Auditor.

The CHAIRMAN: I have now what is in this Company a very pleasant duty to perform—that of expressing our thanks to the Staff and Workmen at Home and Abroad for their care of our business. We cannot at present fill the place of Mr. Lyle, and this has put additional work and responsibility on the others. They have the increasing Government requirements and the difficulty of supply of material, and yet have surpassed their record of Gas Sales. Correspondence is irregular, and Mr. Savage has had to act largely on his own initiative. His absence on a short holiday has been well filled by Mr. Gladstone, who came from Bombay. Our Accountant Mr. Atkinson's work has increased with the growth of the Inland Revenue demands, as Mr Monson's with the protection of your Works. They, with Messrs. Bathgate, Pope, Weldon, and Page, have given of their best, to which Mr. Savage testifies in his report. Mr. Weldon has, during the year, been seriously ill, but is improving in health, and we hope this will continue. Our London Staff have suffered depletion in numbers, and have had extra burdens placed upon them, owing to the increasing difficulty in obtaining supplies for shipment. These they have borne without complaint. I ask you therefore to accord a very well deserved vote of thanks to the Staff and Workmen in London and Calcutta.

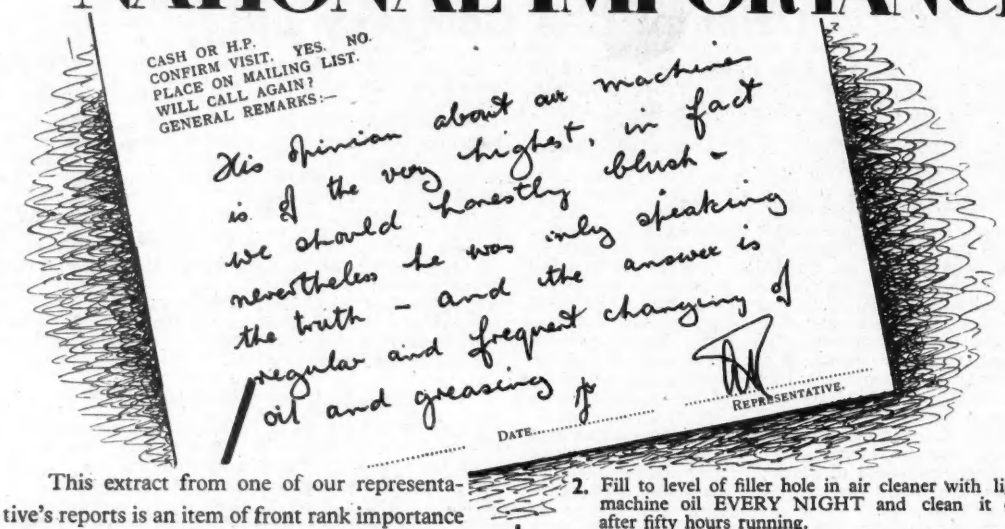
Mr. PADDON seconded this, with the remark that, with some conversancy with service in the East, he thoroughly endorsed what the Chairman had said.

The vote having been heartily accorded, the SECRETARY briefly acknowledged it, and said he would be pleased to see that this appreciation of the work of the Staff and Workmen was transmitted to Calcutta.

Mr. BRADFIELD, proposing a vote of thanks to the Chairman and Directors for their services during the past year, said that, while the shareholders must agree with all that had been said regarding the Staff, the policy of the Company was directed by the Board, and it had always been a cautious one. Anyone who studied the capital expenditure per 1,000 cu.ft. year by year would see that it told a really remarkable story, and there were many similar companies in England who would be glad to be in the same position. This was due to the policy of the Board.

Mr. CARTER seconded the vote, which was unanimously endorsed; and the CHAIRMAN's acknowledgment, on behalf of his colleagues and himself, brought the proceedings to a close.

A matter of NATIONAL IMPORTANCE


CASH OR H.P.
CONFIRM VISIT. YES. NO.
PLACE ON MAILING LIST.
WILL CALL AGAIN?
GENERAL REMARKS:—
His opinion about our machine is of the very highest, in fact we should honestly blush — nevertheless he was only speaking the truth — and the answer is regular and frequent changing of oil and greasing of
DATE
REPRESENTATIVE.

This extract from one of our representative's reports is an item of front rank importance in these times when it is so vitally necessary to conserve material and get the fullest possible service from all equipment. Muir-Hill Dumpers are built to stand up to the hardest work and give years of valiant service under even the worst conditions—but their usefulness can be prolonged almost indefinitely if they receive the care and attention they deserve. The secret is oil and grease, and the regular changing of engine oil in particular.

Do you know that to get the best out of your Dumpers you should :—

1. Test the level of the oil and fill up to "F" mark on the dip stick TWICE A DAY.
2. Fill to level of filler hole in air cleaner with light machine oil EVERY NIGHT and clean it out after fifty hours running.
3. Grease ALL points around your dumper EVERY NIGHT.
4. Change engine oil completely after every fifty hours' running.

These and a number of other instructions are given in detail on the Lubrication Chart sent out with every Dumper leaving our works. If you own or operate a MUIR-HILL Dumper see that these instructions are carried out. They were compiled to help you get years of trouble-free running from your machine. Strict attention to lubrication is always desirable, but under the present conditions, when every piece of plant should be kept running with the minimum of breakdowns and the minimum demand for spare parts, it is a National Duty.

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WILL DOUBLE THE LIFE OF YOUR MUIR-HILL DUMPERS

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THE WORLD'S BIGGEST DUMPER BUILDERS

Gas Products Prices

The Provinces

Jan. 5.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4½d. to 4¾d.; low gravity, 4½d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

The London Market

Jan. 5.

Current prices of Coal Tar Products in the London market are about as under:

Pitch nominal; creosote 5d. to 5¼d.; refined tar 4d. to 4¼d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d.; and 90/160 pyridine 13s. 6d.; all per gallon naked *ex* Makers' Works. By the Direction issued under the Control of Coal Tar Order, 1941, maximum prices have been fixed for all grades of Naphthalene. The maximum price for refined crystal naphthalene in 2-cwt. bags and in 4-ton lots is £23 per ton delivered.

Tar Products in Scotland

GLASGOW, Jan. 3.

Market is strong. Refined tar 4¾d. to 5d. home and 4¼d. to 4½d. per gallon export. Creosote oil: Specification oil, 5¾d. to 6d.; low gravity, 6½d. to 7d.; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk. Cresylic acid nominal. Pale, 99/100%, 4s. 9d. to 5s. 3d. Pale, 97/99%, 4s. 3d. to 4s. 9d.; Dark, 97/99%, 4s. to 4s. 3d. per gallon; all *ex* Works in buyers' packages. Crude naphtha 6½d. to 7d. Solvent naphtha, 90/160 grade 2s. and 90/190 Heavy Naphtha 1s. 9d. per gallon. Pyridines slow. 90/160 grade 14s. and 90/140 grade 16s. per gallon.

Cements for Hot Patching

In gas-works operating horizontal retorts hot patching is sometimes necessary. For this purpose it is essential that a reliable and well-balanced refractory cement should be available. Such a material should be highly siliceous to be sufficiently refractory, must be well mixed under heavy pressure, and of the right grain size to plug large and small cavities under heat. It should be of such a composition that it vitrifies at the right temperatures of patching in order to "stay put." Fireclays and ill-assorted or badly mixed fire cements quickly blow or do not "stay put." In the case of sodium silicate cements these often set hard in the keg, so cannot be worked up again. For "ONX" brands of super-hot patching fire cements the makers claim remarkable properties, as they are a carefully thought out and scientific mixture, proved in practice by a large number of important gas companies. Super 83 cement is very reliable for making good the wear between the fireclay mouthpiece and the first segment, besides hot patching retorts. It is extensively used for setting regenerator tubes, repairing furnace walls, or making a "wash" for washing out new retorts or regenerator tubes. For the highest temperatures other super brands are specially made. "ONX" is the registered trade name used for all brands of fire cements made by A. L. Curtis & Co., Westmoor Works and Laboratory, Chatteris, Cambs.

"Ironmonger" Diary

Despite all the difficulties that beset the trade and technical Press, the *Ironmonger* Diary and Hardware Buyers' Guide has made its 74th annual appearance on time, and in form and substance very little different from pre-war days. The 300 odd pages of displayed advertising in the 1942 Diary reflect the faith of one of the nation's biggest industries in the value of advertising at a time when the pessimists are declaring that it must take a back seat, and its index, buyers' guide, and classified list of trade marks, brands, and special names are thoroughly comprehensive in spite of the fact that many items are in short supply. The literary section is inevitably devoted almost entirely to wartime matters, ranging from fire watching to price control and covering control of shops and materials, trade licences, limitation of supplies, paper restrictions, plant examination, purchase tax, steel distribution symbols, war damage insurance, and other subjects closely affecting the everyday business of manufacturers, wholesalers, and retailers. The directory section includes, besides lists of scientific, technical, and trade associations, particulars of the regional offices of the Ministry of Labour and National Service, and the addresses of the various supply control departments.

The Factory of Alder & Mackay, Ltd., Edinburgh, was, on Dec. 30 last, honoured by a visit from the Lord Provost, the Rt. Hon William Y. Darling. The Lord Provost was received by the Board under the leadership of the Chairman, Mr. J. Miller Thomson, and made a tour of the modern machines and processes now in operation, after which he made a short speech to the employees and complimented them upon what he had seen.

TRADE CARDS

THE WHESSOE FOUNDRY AND ENGINEERING CO. LTD.

Darlington. **T/N** Darlington 2734. **T/A** Whessoe, Darlington, and Potten End, Berkhamsted. **T/N** Berkhamsted 330. **T/A** Whessoe, Berkhamsted.

Cylindrical, Spherical, Spiral and Column Guided Gasholders. Electro-Detarrers, Washers, Purifiers, Condensers.

FULL particulars of these spaces can be obtained on application to the Publishers. They are designed principally for the use of the firms whose display advertisements cannot be included owing to paper rationing.

CLAYTON, SON & CO. LTD.

Moor End Works, Hunslet, Leeds. **T/N** Leeds 75226-9. **T/A** Gas Leeds. London Office: 2, Victoria Street, S.W. 1. **T/N** Abbey 1754.

GASHOLDERS, BOILERS, PIPES.

FOUR OAKS SPRAYING MACHINE CO.

Four Oaks, Birmingham. **T/N** Four Oaks 305. **T/A** Sprayers, Four Oaks.

Specialists in
SYRINGES AND SPRAYING MACHINES.

WALTER KING, LTD.

51, High Street, Esher, Surrey. **T/N** Esher 1142.

Publishers of the "GAS SALESMAN." Annual Subscription 6s. The monthly paper for the Service, Maintenance, and Sales side of the Gas Industry.

Appearing in entirely new style in 1942.

WALTER KING, LTD.

51, High Street, Esher, Surrey. **T/N** Esher 1142.

"GAS SALESMAN'S POCKET BOOK, 1942." A reprint to replace worn copies or for use of new personnel.

2s. per copy post free.

For particulars see "GAS JOURNAL," Dec. 3, 1941, p. 348.

For every size of works and every class of coal...

WEST'S

CARBONIZING PLANTS

GLOVER-WEST VERTICALS

WESTVERTICAL CHAMBERS

440 carbonizing plants have been built or are under construction by West's in 24 countries. Working results from a wide variety of gas coals have established the high efficiency and adaptability of the West systems.

WEST'S

GAS IMPROVEMENT CO · LTD ·

MILES PLATTING MANCHESTER 10

TELEPHONE—COLLYHURST 2961-2-3-4-5 TELEGRAMS—STOKER, MANCHESTER

LONDON OFFICE TEMPORARY ADDRESS—BATH ROAD · HARMONDSWORTH · WEST DRAYTON MIDDLESEX TEL.—WEST DRAYTON 2288-9

GAS STOCKS AND SHARES

Gas stocks and shares were well supported last week when supplies were available and prices continued firm. A brisk business was done in Gas Light units and enquiries for Tottenham 5% preference led to a rise of 4 points to 84½. It is evident that shortage of supplies is keeping down the quotations of a number of stocks, especially of the fixed-interest variety, but it is interesting to note that South Metropolitan 4% preference, on which no dividend has been paid since the June half-year 1940, is only 5 points below a similar dividend-paying stock of the South Surburban Company.

The following price changes took place up to Wednesday, December 31 last:

OFFICIAL LIST

Alliance & Dublin 4 p.c. Deb. (x.d.)	95—100	Dec. 29
Croydon 5 p.c. Deb. (x.d.)	99—104	,,
South Metropolitan 3 p.c. Deb. (x.d.)	70—75	,,
Tottenham 5 p.c. Pref.	82—87	+4
United Kingdom 4½ p.c. 2nd Non-Cum. Pref.	12/6—14/6	+1/6

SUPPLEMENTARY LIST

Croydon 4 p.c. Deb. (x.d.)	80—85	Dec. 29
Malta and Mediterranean 7 p.c. 1st Pref. (x.d.)	50—60	,,
Reading 4 p.c. Deb. (x.d.)	70—75	,,

PROVINCIAL EXCHANGES

Liverpool 4 p.c. Deb.	98—100	+1

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 31.
1,767,439	Sept. 15	7	6	Alliance & Dublin Ord. ...	93—98
374,000	Dec. 29	4	4	Do. 4 p.c. Deb.	95—100
957,608	Nov. 10	5	5	Ascd. Gas & Water U'd'ts Ord.	14/3—15/3
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	14/—16/—
535,545	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	14/—16/—
336,646	,,		4	Do. 4 p.c. Irred. Cum. Pref.	9/6—11/6
561,370	Aug 18		7	Barnet Ord. 7 p.c.	115—120
300,000	Oct. 27	1/4⅜	1/9⅜	Bombay, Ltd.	21/6—23/6
690,407	Aug. 25	7	7	Bournemouth 7 p.c. max. ...	118—123
362,025	June 16	4	4	Do. 4 p.c. Deb. ...	90—95
659,955	Oct. 20	4⅜	2½	Brighton, &c., 5 p.c. Con. ...	60—65
855,000	Sept. 22	6	6	Brit. Gas Light Ord.	71—76
545,000	Dec. 15	5½	5½	Do. 5½ p.c. 'B' Cum. Pref	105—115
120,000	,,	4	4	Do. 4 p.c. Red. Deb.	75—80
10,000	Nov. 6 '33	6	4	Cape Town, Ltd., 4½ p.c. Cu. Pf.	¼—¾
626,860	July 21	6	6	Cardiff Con. Ord.	95—100
24,500	Sept. 29	7	7	Colombo 7 p.c. Pref.	19/—21/—
764,169	Sept. 29	-/11.48	-/11.48	Colonial Gas Assn. Ltd. Ord. ...	14/—16/—
400,000	,,	1/3.30	1/3.30	Do. 8 p.c. Pref. ...	19/—21/—
1,748,935	July 22 '40	2	3	Commercial Ord.	31—36
620,000	Dec. 8	3	3	Do. 3 p.c. Deb.	55—60
286,344	Aug. 18	5	5	Do. 5 p.c. Deb.	87—92
807,560	Aug. 11	6	6	Croydon sliding scale	92—97
644,590	,,	5	5	Do. max. div.	80—85
620,385	Dec. 29	5	5	Do. 5 p.c. Perp. Deb. ...	99—104
179,500	Aug. 18	5	5	East Surrey 'B,' 5 p.c.	65—70
176,461	Dec. 15	5	5	Do. 5 p.c. Deb. (Irred.)...	90—95
250,000	Nov. 10	6	4	Gas Consolidation Ord. 'B' ...	13/6—14/6
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	14/6—16/6
19,122,910	July 29 '40	3⅜	4½	Gas Light & Coke Ord. ...	12/6—13/6a
2,600,000	,,	3½	3½	Do. 3½ p.c. max.	45—50
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	65—70
2,993,000	July 8 '40	3½	3½	Do. 3½ p.c. Red. Pref. ...	67—72
8,602,497	Dec. 1	3	3	Do. 3 p.c. Con. Deb. ...	73—78
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	103—106
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	100—103
700,000	Sept. 8	3½	3½	Do. 3½ Red. Deb. ...	83—88
5,600,000	May 13 '40	4	8	Imperial Continental Cap. ...	53—58
43,820	July 28	3½	3½	Do. 3½ p.c. Red. Deb. ...	80—88
231,978	Aug. 25	5	5	M.S. Utility 'C' Cons.	68—73
918,657	,,	4	4	4 p.c. Cons. Pref.	73—78
675,000	Nov. 10	¼	¼	Montevideo, Ltd.	60—65
300,000	Dec. 15	7	9	Oriental, Ltd.	113—118
368,537	July 14	6½	3½	Plymouth & Stonehouse 5 p.c.	65—70
621,667	Aug. 18	7½	7½	Portsmouth & Gosport Cons.	87—92
648,999	Sept. 8	1/1	1/1½	Severn Val. Gas Cor. Ld. Ord.	15/6—17/6
597,972	,, 8	-/10⅜	-/10⅜	Do. 4½ p.c. Cum. Pref. ...	16/—18/—
2,528,714	Aug. 25	1/	7½	South East'n Gas Cn. Ld. Ord.	13/6—14/6
1,000,000	,,	-/10⅜	-/10⅜	Do. 4½ p.c. Red. Cum. Pref.	14/6—16/6
1,068,869	,,	4	4	Do 4 p.c. Irred. Cum. Pref.	11/6—13/6
6,709,895	Aug. 5 '40	4	4	South Met. Ord.	48—53
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	75—80
850,000		4	4	Do. 4 p.c. Irred. Pref. ...	60—65
1,895,445	Dec. 29	3	3	Do. 3 p.c. Perp. Deb. ...	70—75
1,000,000	July 14	5	5	Do. 5 p.c. Red. Deb. ...	100—105
1,543,795	Sept. 8	4	2	South Suburban Ord. 5 p.c ...	61—66
512,825	,,	5	5	Do. 5 p.c. Perp. Pref. ...	72—77
500,000	,,	4	4	Do. 4 p.c. Perp. Pref. ...	65—70
250,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Pref. ...	78—83
888,587	Dec. 15	5	5	Do. 5 p.c. Perp. Deb. ...	97—102
750,541	Aug. 18	5	2	Southampton Ord.	50—55
350,000	,,	5½	5½	Swansea 5½ p.c. Red. Pref. ...	88—93
1,076,495	,,	5	5	Tottenham & District Ord. ...	73—78
338,555	,,	5	5	Do. 5 p.c. Pref.	82—87
453,380	Dec 8	4	4	Do. 4 p.c. Perp. Deb. ...	82—87
1,247,505	Dec. 1	4	¼	U. Kingdom Gas Cor. Ord. ...	13/6—15/6
1,085,952	Nov. 17	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	14/6—16/6
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum.Pref.	14/6—16/6
745,263	June 16	4½	4½	Do. 4½ p.c. 2nd Non.Cum. Pf.	12/6—14/6
1,200,000	Sept. 22	3½	3½	Do. 3½ p.c. Red. Deb. ...	86—91
380,606	Aug. 18	7	6⅜	Uxbridge, &c., 5 p.c.	85—90
1,371,138	Sept. 1	4	4	Wandsworth Consolidated ...	70—75
2,525,768	,,	4	4	Do. 4 p.c. Pref.	67—72
1,343,964	Dec. 15	5	5	Do. 5 p.c. Deb.	99—104
383,745	,,	4	4	Do. 4 p.c. Deb.	79—84
558,342	Aug. 25	5	5	Watford & St. Albans Ord. ...	85—90
300,000	Dec. 8	3½	3½	Do. 3½ p.c. Red. Deb. ...	84—89

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 31.
351,685	Dec. 15	5	5	Brighton, &c., 5 p.c. Perp. Deb.	93—98
28,700	,,	5½	5½	Do. 5½ p.c. Red. Deb. 1942 ...	95—100
415,250	,,	4	4	Bristol Gas Co., 4 p.c. New Deb.	85—90
140,205	Aug. 5	7	7	Cambridge, &c., 7 p.c. Cons. 'B'	105—110
295,932	Aug. 18	5	5	Cheltenham, 5 p.c. Cons. Ord....	85—90
42,500	Dec. 15	4	4	Do. 4 p.c. Perp. Deb....	75—80
150,000	Aug. 11	4	4	Croydon Gas, 4 p.c. Pref. (Irr.)	68—73
130,000	Dec. 29	4	4	Do. 4 p.c. Deb. ...	80—85
146,700	Aug. 18	5½	5½	East Surrey, 5½ p.c. Pref. 'A' ...	85—90
53,220	,, 10	6	6	Do. 6 p.c. Cum. Pref. ...	90—100
...	Aug. 19 '40	6	4	Eastbourne, 'B' 3½ p.c.... ...	35—40
239,135	Nov. 17	5	5	Gas Consolidation 'A' Ord. (£1)	11/6—13/6
156,600	Aug. 18	5	5	Hampton C't, 5 p.c. Cons. Ord.	75—80
18,000	Dec. 29	3½	3½	Malta & Med'n., 7 p.c. 1st Pref.	50—60
10,845	,, 30	3½	3½	Do. 7½ p.c. 2nd Pref.	40—50
50,000	Aug. 25	£5 19 6	£5 4 6	Mid. South. Util., 'A' Cons. 5 p.c.	60—70
65,000	Aug. 18	5	5	North Middlesex, 5 p.c. Pref. ...	75—80
70,000	Sept. 8	5	5	Plymouth & Stone., 5 p.c. Deb.	83—88
76,501	Dec. 29	4	4	Reading, 4 p.c. Perp. Deb. ...	70—75
74,777	Sept. 30	4	4	Romford, 4 p.c. Debs. (Reg.) ...	77—82
21,000	June 9	5	5	Slough, 5 p.c. Perp. Deb. ...	87—92
211,740	,, 16	5	5	Southampton, 5 p.c. Red. Deb.	95—100
363,575	July 1	5	5	Tottenham, 5 p.c. Reg. Red. Mt.	97—102
202,019	—	—	—	Tunbridge Wells, 4 p.c. Scale ...	90—100
135,257	Dec. 8	5	5	Uxbridge &c., 5 p.c. Perp. Deb.	97—102

PROVINCIAL EXCHANGES

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 24.
804,948	July 28	5	5	Bath Cons.	93—97
122,577	July 28	6	6	Blyth 5 p.c. Ord.	100—105
1,667,250	July 21	5	5	Bristol, 5 p.c. max.	96—98
120,420	Dec. 15	4	4	Do. 1st 4 p.c. Deb.	98—100
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	96—98
3'28,790	,,	5	5	Do. 5 p.c. Deb.	109½—112½
157,150	Aug. 5	6½	5	Chester 5 p.c. Ord.	96½—99½
92,500	Dec. 15	4	4	Do. 4 p.c. Pref.	77—79
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	77¼—82½
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	91—95
542,270	Aug. 11	9	6	Derby Cons.	98—103
55,000	Dec. 16	4	4	Do. 4 p.c. Deb.	75—80
10,000	Aug. 11	10	10	Great Grimsby 'A' Ord. ...	155—165
6,500	,,	10	10	Do. 'B' Ord.	155—165
79,000	,,	10	10	Do. 'C' Ord.	145—155
732,000	Aug. 25	4	4	Hartlepool G. & W. Co. & New	61—63
2,167,410	Aug 18	6	6	Liverpool 5 p.c. Ord.	98—100
245,500	Dec. 15	5	5	Do. 5 p.c. Red. Pref. ...	95—98
306,083	July 15	4	4	Do. 4 p.c. Deb.	98—100
20,000	June 23	5	5	Long Eaton 5 p.c. Pref.	9—11
80,000	,,	5	5	Do. 5 p.c. Deb.	87—92
2,430,267	July 28	5½	5	Newcastle and Gateshead Con.	18/6—19/—a
682,856	,,	4	4	Do. 4 p.c. Pref.	83½—84½
776,706	June 30	3½	3½	Do. 3½ p.c. Deb.	83—84
277,285	Nov. 3	5	5	Do. 5 p.c. Deb. '43 ...	99—101
274,000	March 17	5	5	Newport (Mon.) Ord.	86—89
13,200	Sept. 16	8‡	7	Pontyp'l Gas & W. 10 p.c. 'A'	11½—12½
13,600	,,	6	5	Do. 7 p.c. 'B'	9½—10½
40,000	,,	5	6	Do. 7 p.c. 'C'	9½—10½
106,280	Aug. 11	10	10	Preston 'A' 10 p.c.	155—165
188,219	,,	7	7	Do. 'B' 7 p.c.	113—123
1,806,339	Aug. 25	6½	6½	Sheffield Cons.	120—125
95,000	July 7	4	4	Do. 4 p.c. Deb.	96—99
332,351	Sept. 8	6	6	Sunderland 6 p.c. max. ...	107—110
192,150	Aug. 11	5	5	Weston-super-Mare Cons. ...	85—90
64,338	June 30	4	4	Do. 4 p.c. Deb.	80—85
33,340	,,	7½	7½	* Do. 7½ p.c. Deb.	135—140

a.—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

En passant

Things without all remedy
should be without regard: what's done is done.
Shakespeare (Macbeth).

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Number Forty-one

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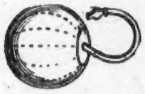

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in the tool-room
ALCOSA
Combined
FORGE-FURNACE
AND BLOWPIPE HEARTH
P.F. 040 • • •

Convertible from forge furnace to blow pipe hearth and vice versa in a few minutes. Full blast for both blow pipes used simultaneously with hearth. Only one gas connection. Can be used also for soldering, brazing, melting, etc.

★
Fans and Blowers, hand and power, to suit all requirements.

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Telephone: MIDland 4804/5/6. Telegrams: "Yadall," Birmingham.

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Thomas & Bishop, Ltd.	69
Trotter, Haines & Corbett, Ltd.	73
Turbine Furnace Co., Ltd. ...	40
Walker, C. & W., Ltd.	65
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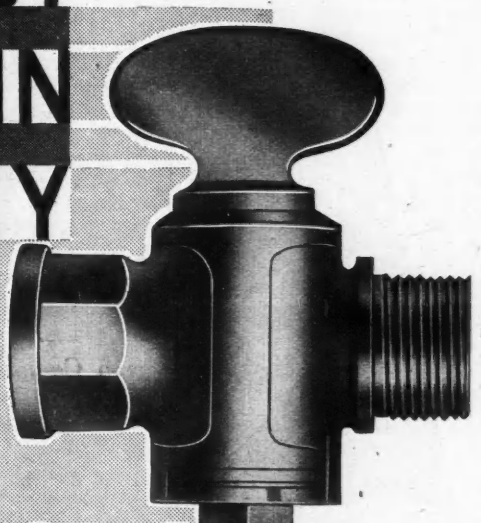
THE FOREMOST GAS COCK IN THE INDUSTRY



THE 'SPERSOM' GAS COCK possesses unique and valuable features of construction.

THE SELF-LUBRICATING FEATURE utilizes the principle of capillary attraction. Consequently oil is fed constantly from a small reservoir in the head of the plug thereby replacing any lost in service.

THE APPLICATION OF THE SPRING LOADING to the plug is carried out in a special manner, which ensures that the plug is always retained on its bearing at a uniform pressure. Dismantling is never necessary.

COCKS FOR ALL PURPOSES can be supplied with these features—Main Service, Gas Fire, Gas Cooker, etc.

Spersom

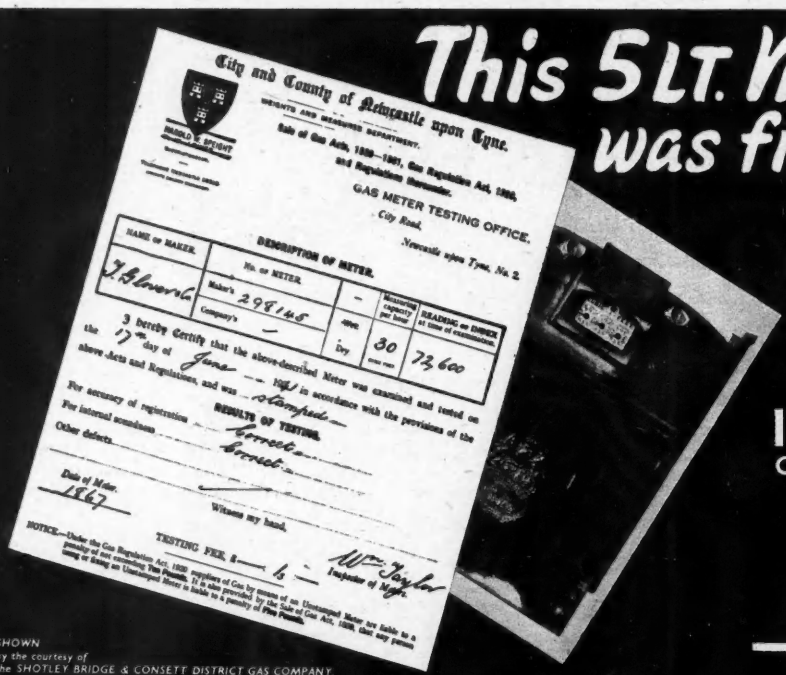
REGISTERED TRADE MARK

MADE IN ENGLAND BY SPERRYN & CO., MOORSOM ST. BIRMINGHAM

This 5 LT. Meter was fixed in.... 1867

IT HAS NEVER BEEN REPAIRED

IT IS REGISTERING CORRECTLY IN.... 1941


City and County of Newcastle upon Tyne.
GAS METER TESTING OFFICE.
City Road,
Newcastle upon Tyne, No. 2.
DESCRIPTION OF METER.
NAME OF MAKER: J. Glover & Co
No. OF METER: Maker's 298148 / Company's —
CAPACITY: 5 cubic feet
DIAL READING: 73,600
I hereby Certify that the above-described Meter was examined and tested on the 17th day of June 1941 in accordance with the provisions of the above Acts and Regulations, and was stamped
RESULTS OF TESTING.
For accuracy of registration Correct
For internal soundness Correct
Other defects —
Date of Make 1867
Witness my hand,
TESTING FEE, 5/- Wm. Taylor Inspector of Meters.

SHOWN
by the courtesy of
the SHOTLEY BRIDGE & CONSETT DISTRICT GAS COMPANY

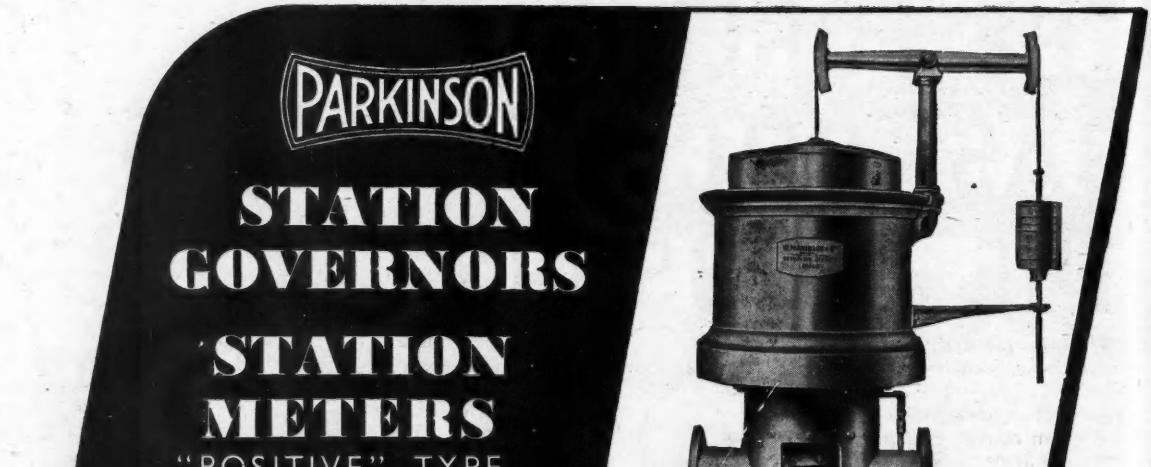
THOMAS GLOVER & Co. LTD.
EDMONTON LONDON N. 18 AND BRANCHES

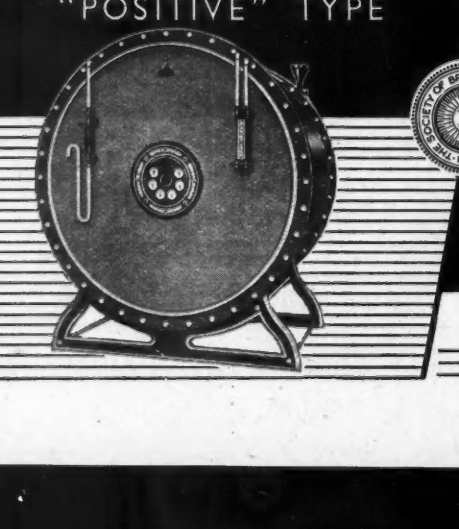
PARKINSON

STATION GOVERNORS

STATION METERS

"POSITIVE" TYPE





W. PARKINSON & CO.
(Incorporated in Parkinson & Cowan (Gas Meters) Ltd.)
COTTAGE LANE WORKS,
CITY ROAD, LONDON, E.C.1
Also at
BIRMINGHAM AND BELFAST